
StripboardProto Documentation

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ponty

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StripboardProto

Date December 28, 2011

PDF StripboardProto.pdf

ABOUT

StripboardProto

Stripboard based modular hardware prototyping system.

Links:

- home: <https://github.com/ponty/StripboardProto>
- documentation: <http://ponty.github.com/StripboardProto>

Features:

- designed for hobby projects
- modular
- the bus consists of 8 bit ports
- passive backplane holds the modules
- Design tool: [EAGLE Light Edition](#)

Example:

backplane

```
II
II
II=C===== microcontroller module
II
II
II=C===== sound module
II
II
II=C===== USB module
II
```

Bus:

```
-----
| Port 1 |                               | Port 2 |
-----
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | POWER | GND | EMPTY | EMPTY | 0 | 1 ...
-----
```

other modular designs:

- <http://www.instructables.com/id/AVR-mini-board-with-additional-boards/>
- Arduino shield

STRIPBOARD DESIGN

Stripboard design representation in eagle:

- holes: copper should be cut or drilled here
- SMD: through-hole component, legs are drawn on top layer
- top layer: wires
- lines on documentation layer: wires
- bottom layer: original parallel strips of copper, only those are drawn, which are used for connection
- via: soldering points

Some electronic components have no 3D view in the documentation.

ATMEGA8

Status: OK

Arduino compatible board for Atmega8/48/88/168 and maybe others also.

features:

- reset button
- 10 pin ISP connector

3.1 Pins

board pin	AVR pin	Arduino pin	comment
0	PB0	D8	
1	PB1	D9	
2	PB2	D10	
3	PB3	D11	MOSI
4	PB4	D12	MISO
5	PB5	D13	SCK
6	NC		
7	NC		
8	POWER		
9	GND		
10	PC0	A0	
11	PC1	A1	
12	PC2	A2	
13	PC3	A3	
14	PC4	A4	
15	PC5	A5	
16	NC		
17	NC		
18	POWER		
19	GND		
20	PD0	D0	RxD
21	PD1	D1	TxD
22	PD2	D2	
23	PD3	D3	
24	PD4	D4	

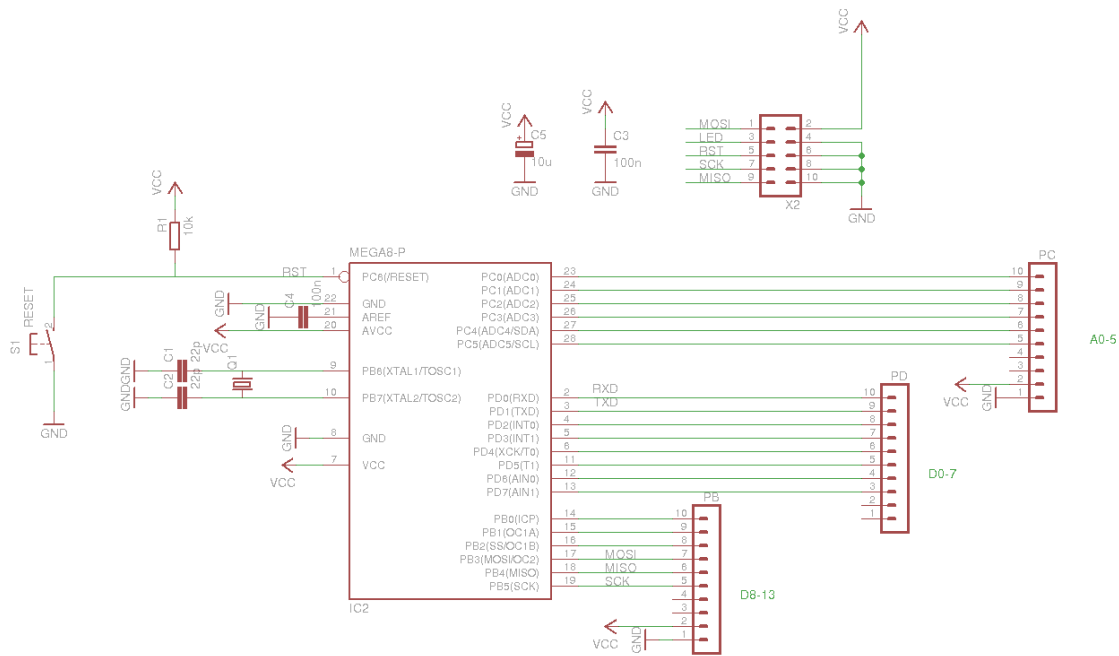
Continued on next page

Table 3.1 – continued from previous page

board pin	AVR pin	Arduino pin	comment
25	PD5	D5	
26	PD6	D6	
27	PD7	D7	
28	POWER		
29	GND		

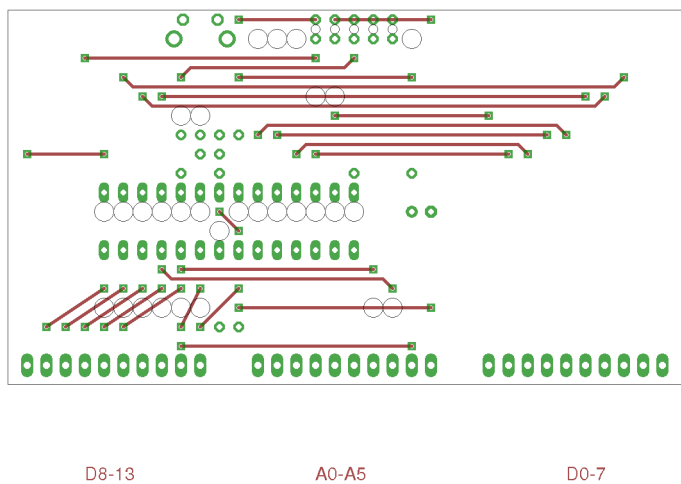
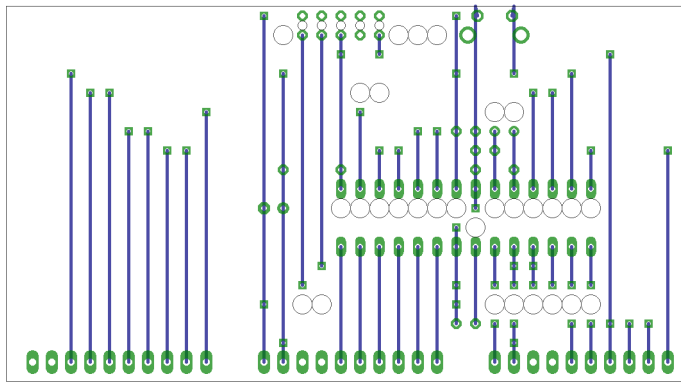
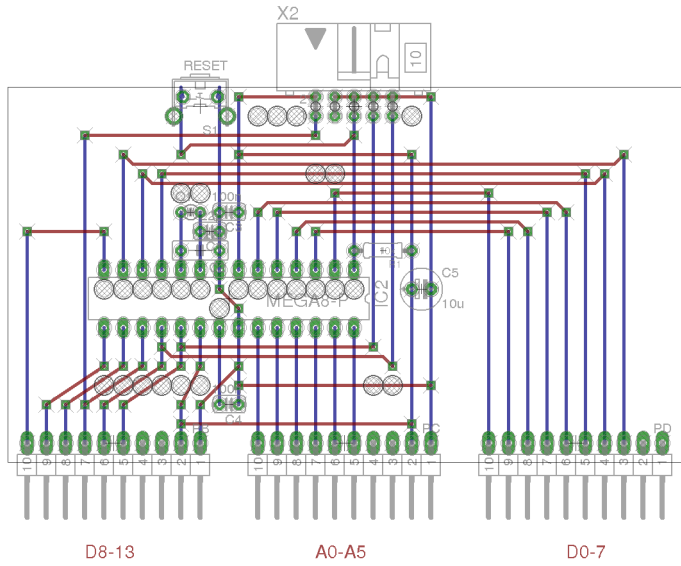
ISP pinout

3.2 Schematic



3.3 Board

Normal, bottom mirrored, wires only:



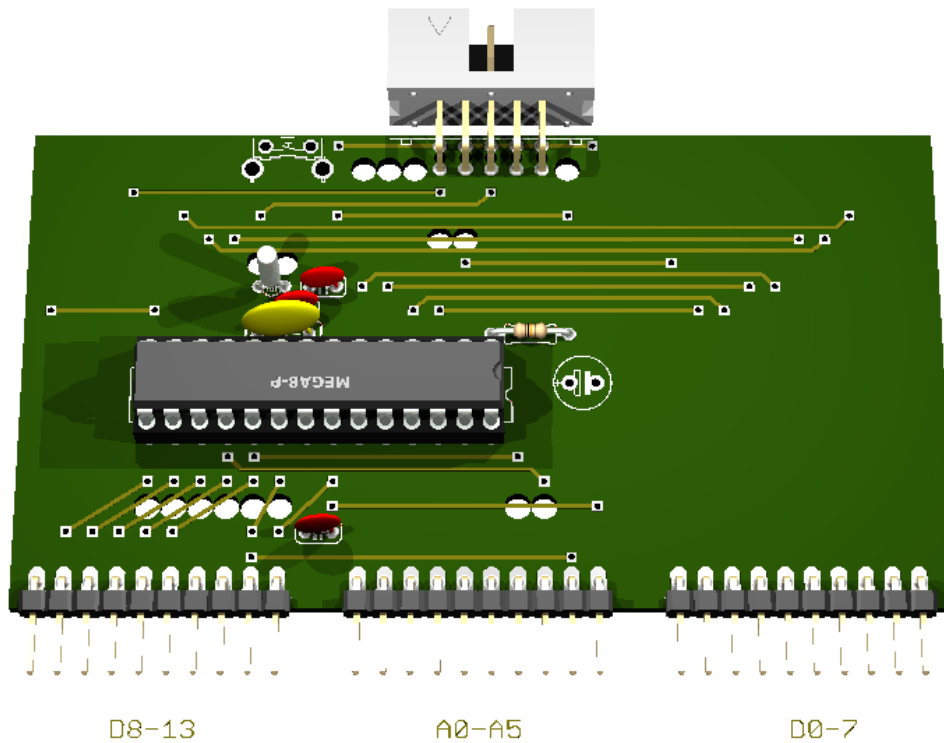
3.4 Partlist

Table 3.2:

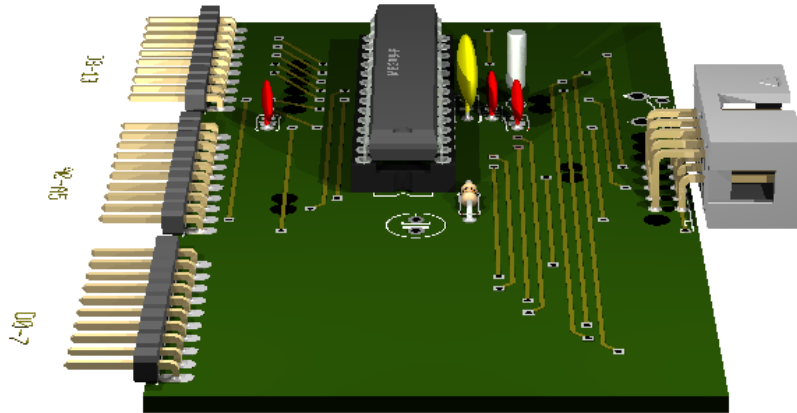
part	value	position
C1	22p	(1.05 1.2)
C2	22p	(1 1.1)
C3	100n	(1.15 1.3)
C4	100n	(1.15 0.3)
C5	10u	(2.15 0.9)
IC2	MEGA8-P	(1.15 0.85)
PB		(0.55 0.1)
PC		(1.75 0.1)
PD		(2.95 0.1)
Q1		(0.95 1.3)
R1	10k	(1.95 1.1)
S1	RESET	(1 1.85)
X2		(1.8 1.85)

3.5 3D view

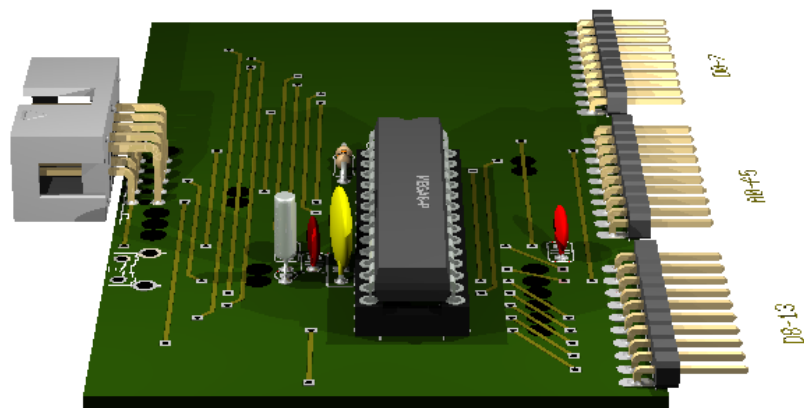
3.5.1 Front



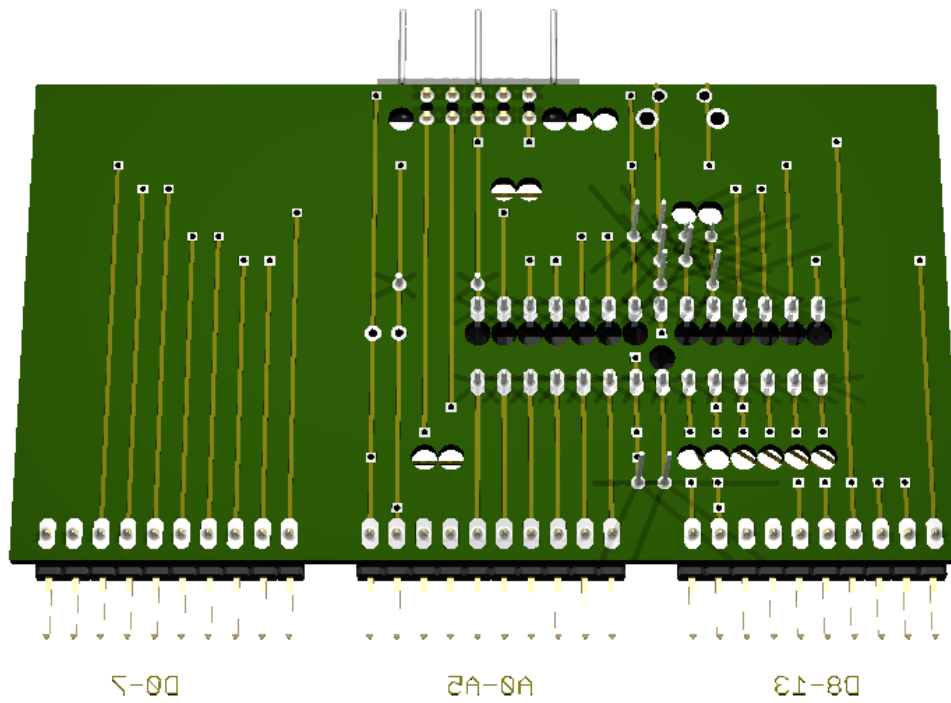
3.5.2 Right side



3.5.3 Left side



3.5.4 Bottom



BUZZER

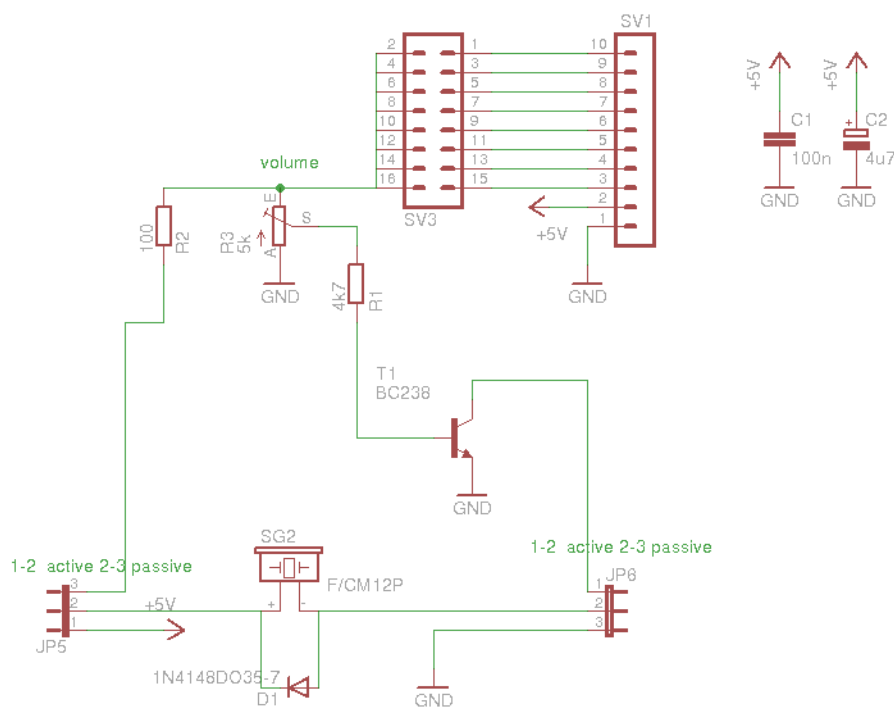
Status: OK

Sound module.

features:

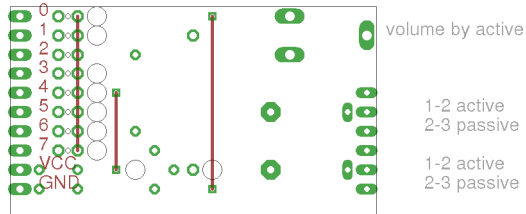
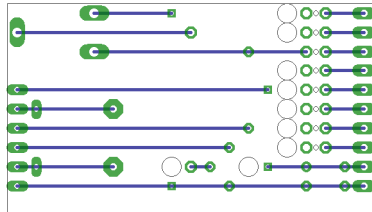
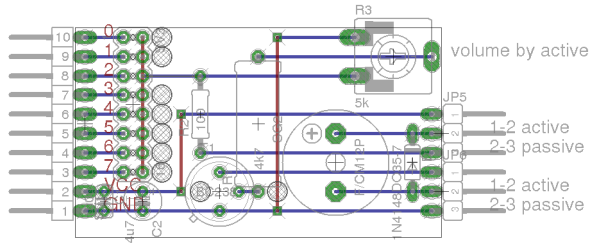
- passive or active
- volume trimmer

4.1 Schematic



4.2 Board

Normal, bottom mirrored, wires only:



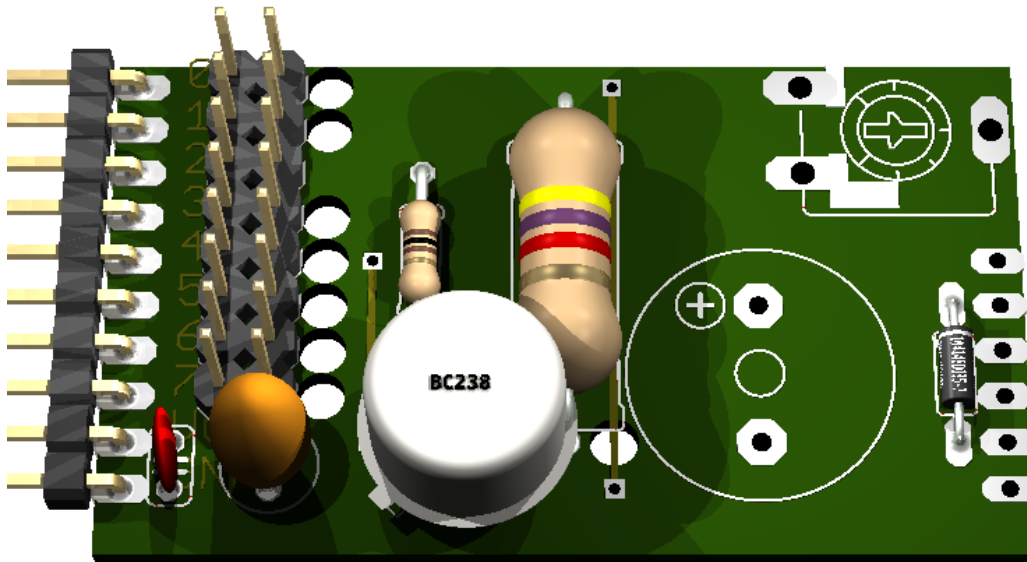
4.3 Partlist

Table 4.1:

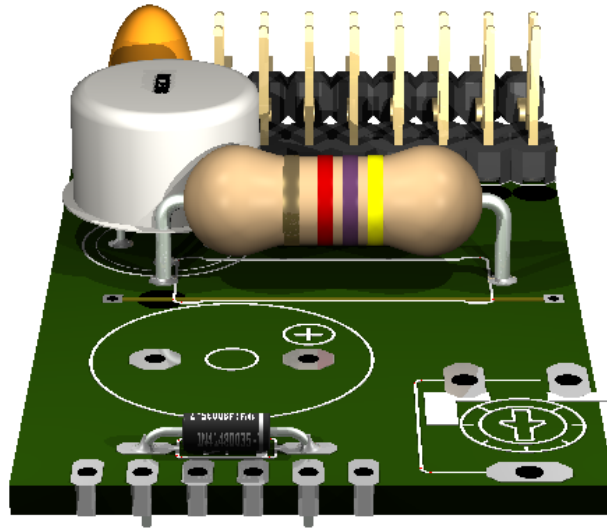
part	value	position
C1	100n	(0.6 0.25)
C2	4u7	(0.8 0.25)
D1	1N4148DO35-7	(2.2 0.45)
JP5		(2.35 0.6)
JP6		(2.35 0.3)
R1	4k7	(1.4 0.65)
R2	100	(1.1 0.7)
R3	5k	(2.1 1)
SG2	F/CM12P	(1.8 0.45)
SV1		(0.5 0.65)
SV3		(0.75 0.75)
T1	BC238	(1.2 0.3)

4.4 3D view

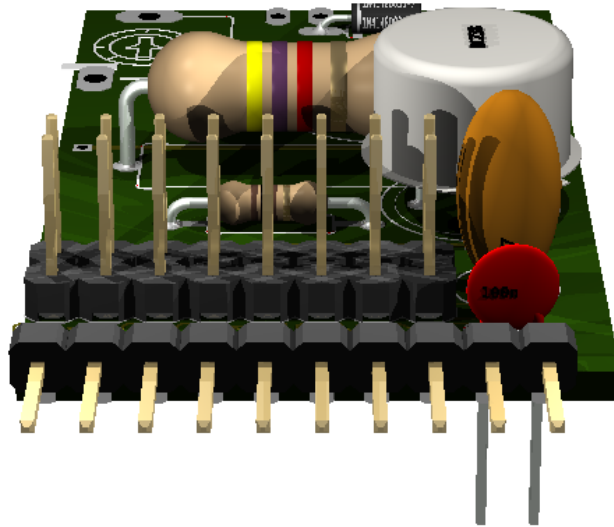
4.4.1 Front



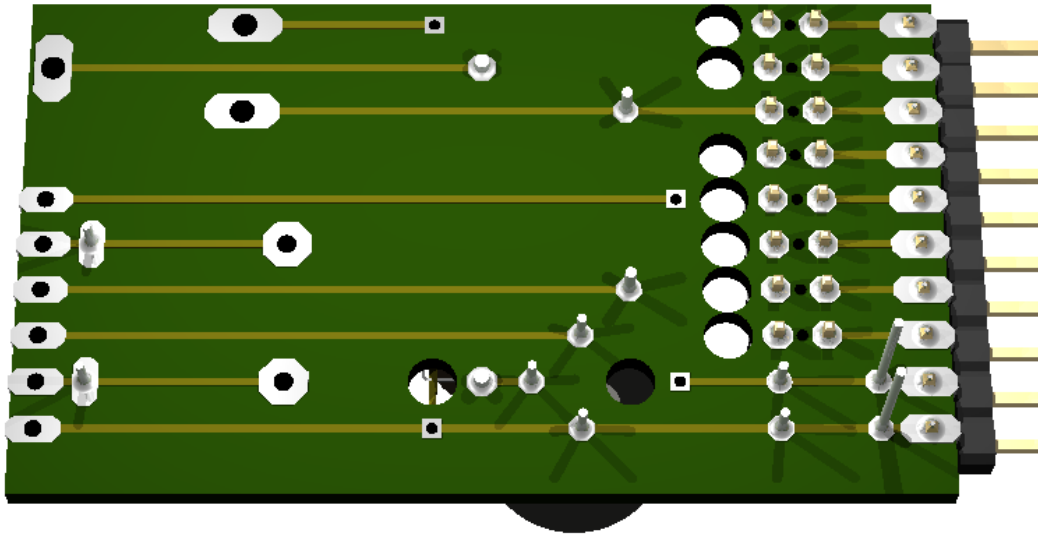
4.4.2 Right side



4.4.3 Left side



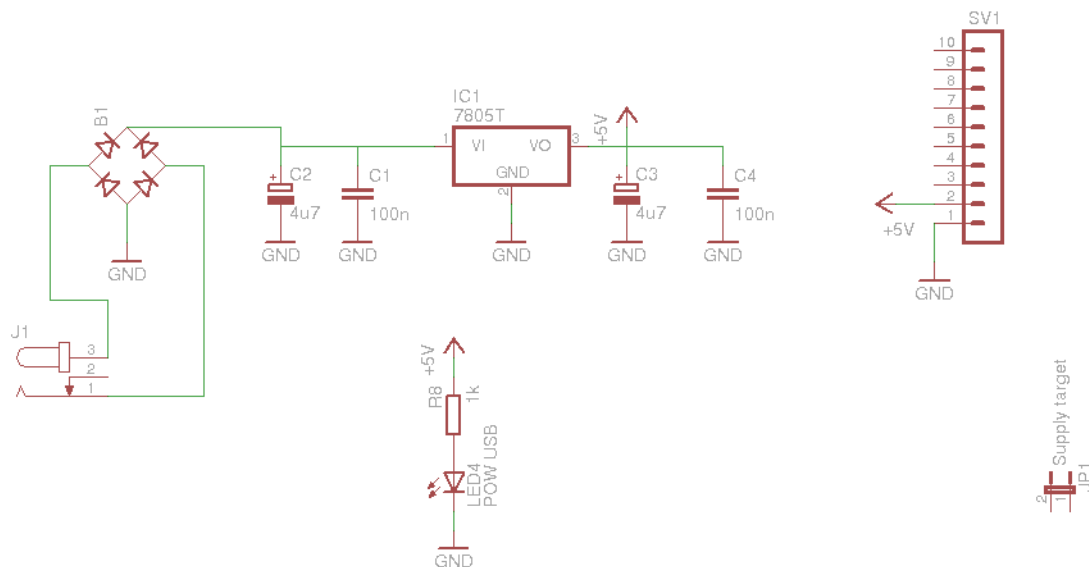
4.4.4 Bottom



EXTERNAL POWER

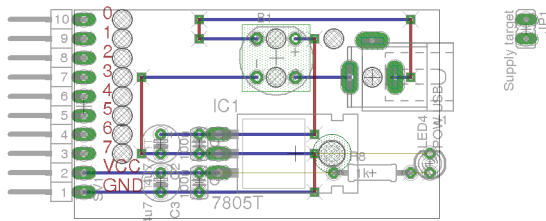
Status: under construction

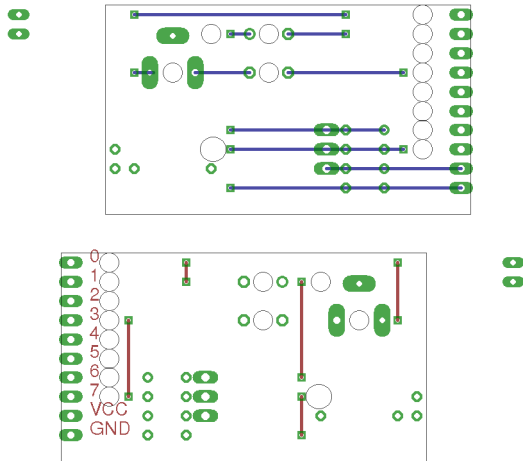
5.1 Schematic



5.2 Board

Normal, bottom mirrored, wires only:





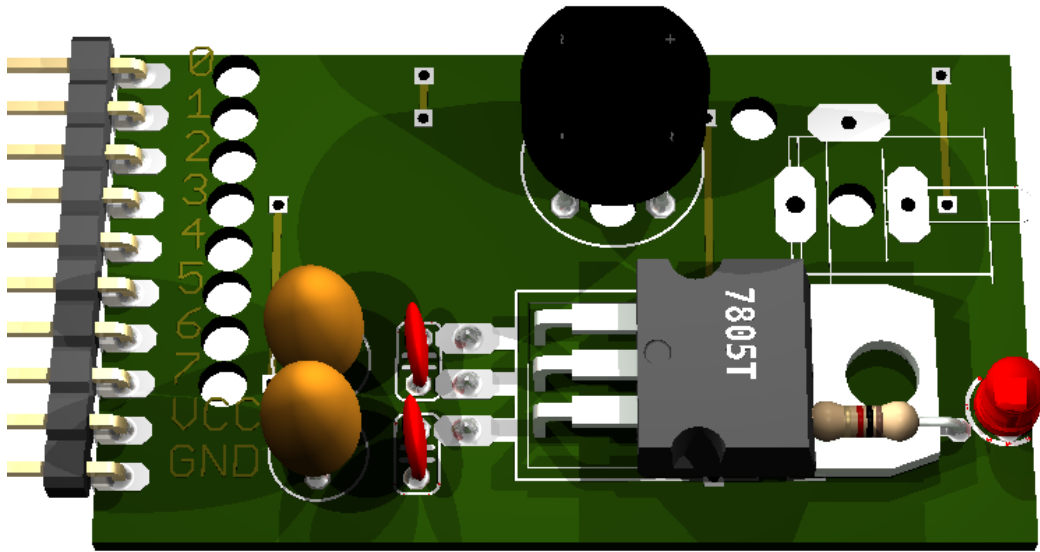
5.3 Partlist

Table 5.1:

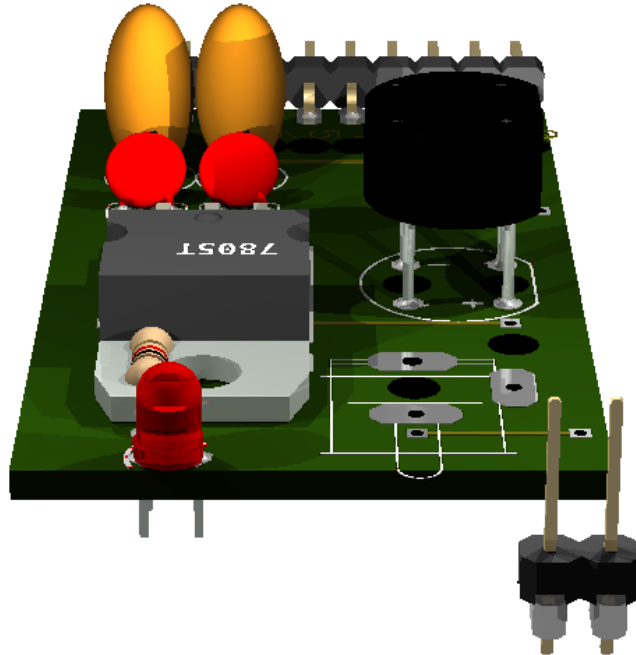
part	value	position
B1		(1.5 0.9)
C1	100n	(1.1 0.45)
C2	4u7	(0.9 0.45)
C3	4u7	(0.9 0.25)
C4	100n	(1.1 0.25)
IC1	7805T	(1.6 0.4)
J1		(2 0.8)
JP1	Supply target	(2.8 1.05)
LED4	POW USB	(2.3 0.35)
R8	1k	(2 0.3)
SV1		(0.5 0.65)

5.4 3D view

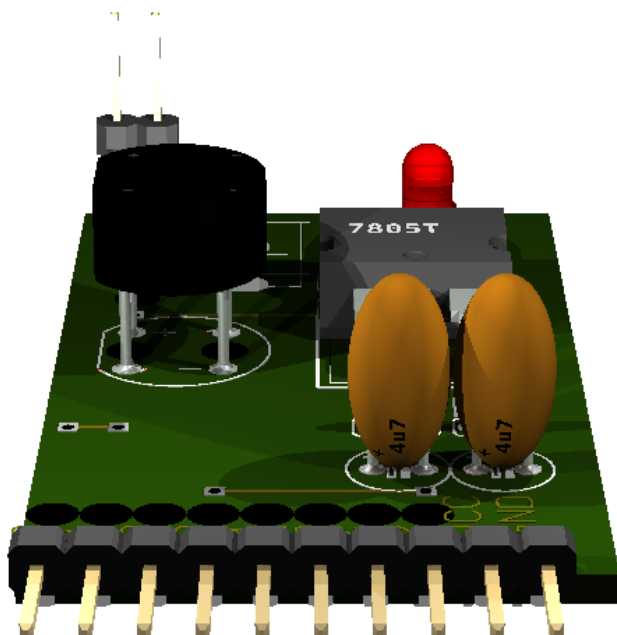
5.4.1 Front



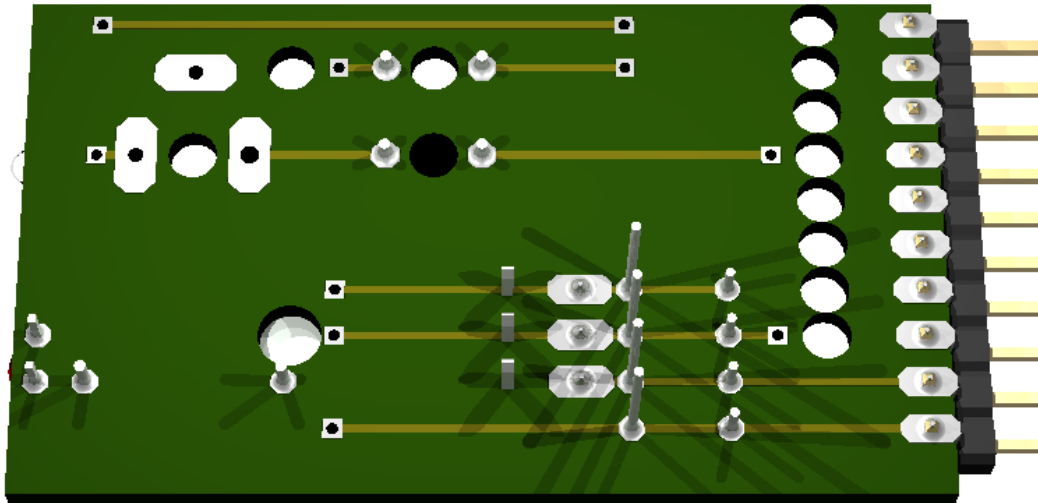
5.4.2 Right side



5.4.3 Left side



5.4.4 Bottom



RS232 ADAPTER

Status: OK

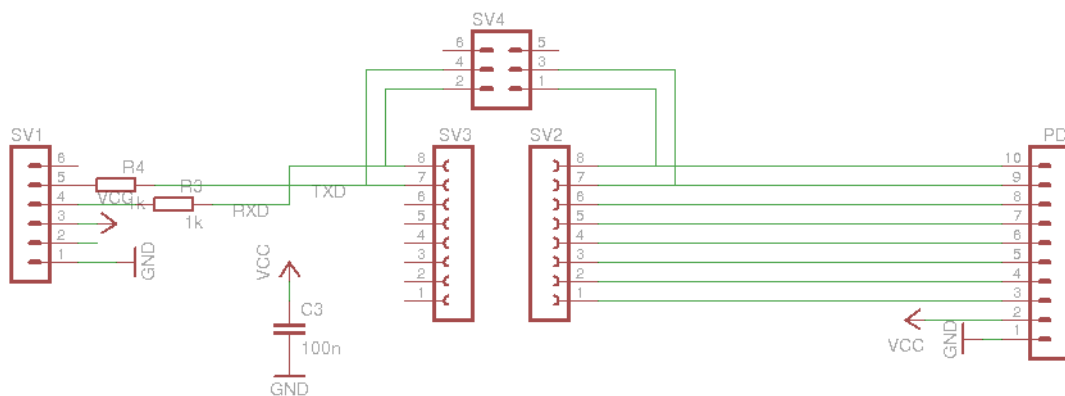
features:

- Jumper pins can be used for default Arduino ports.
- FTDI pinout for RS232 connector

6.1 pins

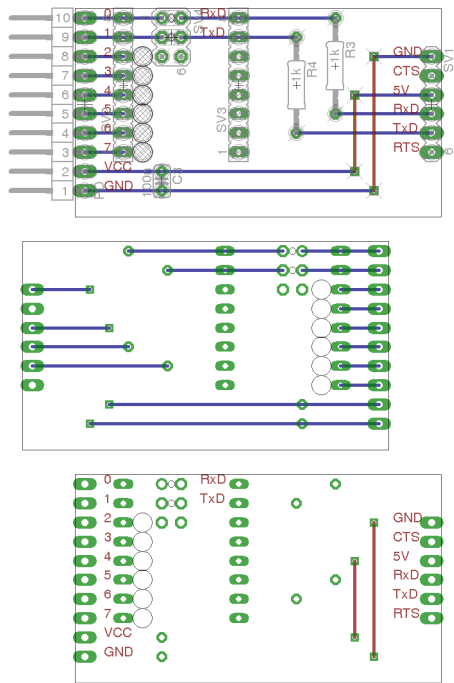
FTDI pin	signal
1	gnd
2	cts
3	5v
4	rxd
5	txd
6	rts

6.2 Schematic



6.3 Board

Normal, bottom mirrored, wires only:



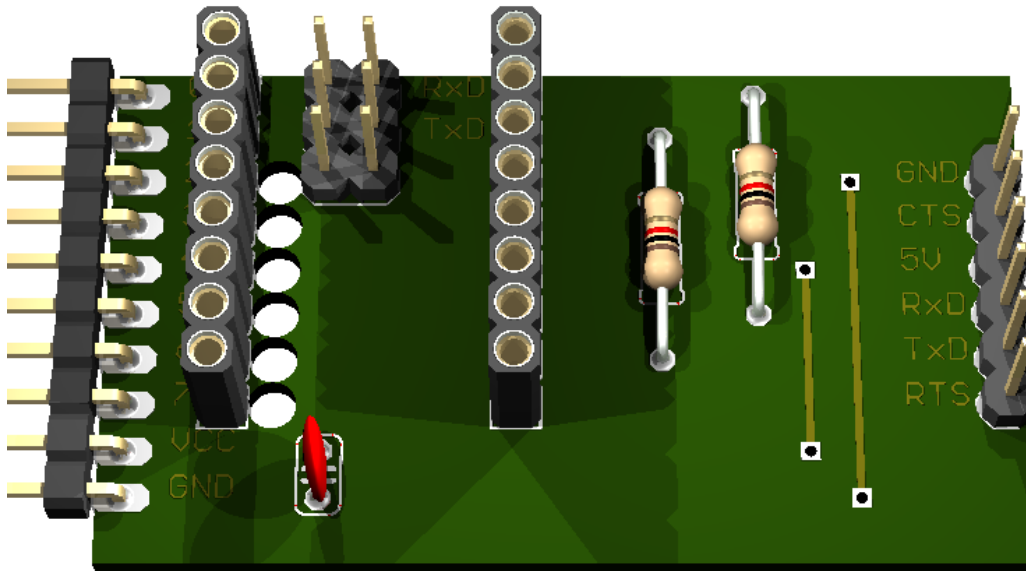
6.4 Partlist

Table 6.1:

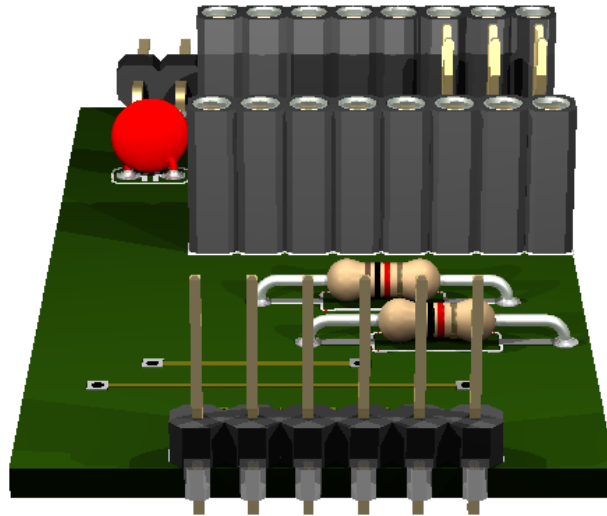
part	value	position
C3	100n	(1.1 0.35)
PD		(0.7 0.75)
R3	1k	(2 0.95)
R4	1k	(1.8 0.85)
SV1		(2.5 0.75)
SV2		(0.9 0.85)
SV3		(1.5 0.85)
SV4		(1.15 1.1)

6.5 3D view

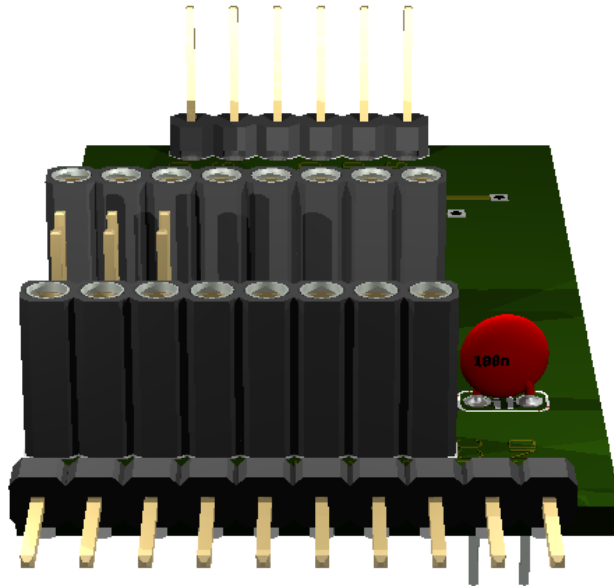
6.5.1 Front



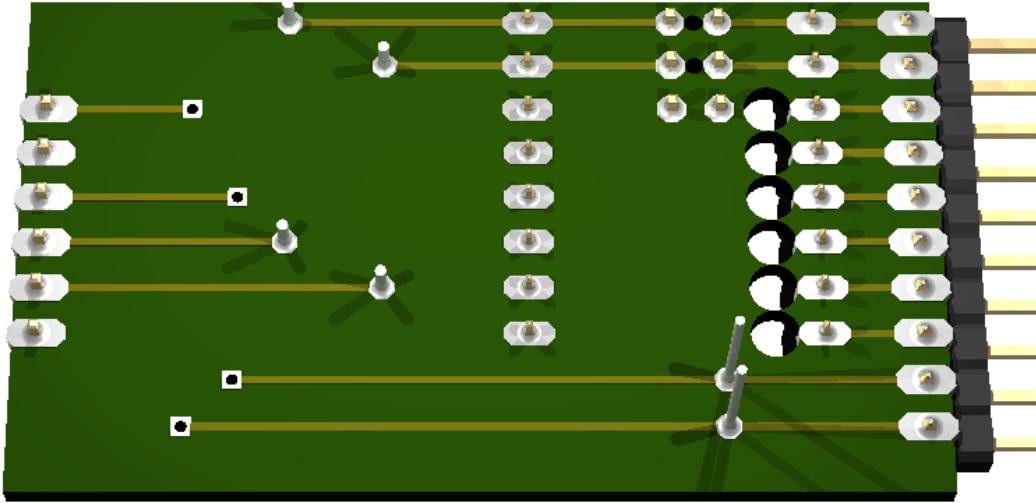
6.5.2 Right side



6.5.3 Left side



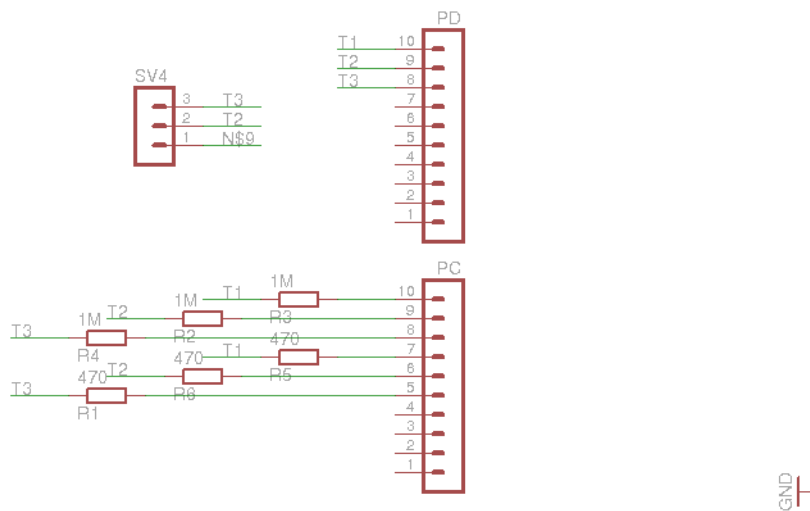
6.5.4 Bottom



ELECTRONIC COMPONENT TESTER

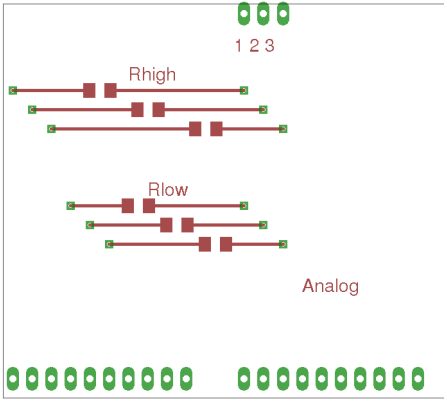
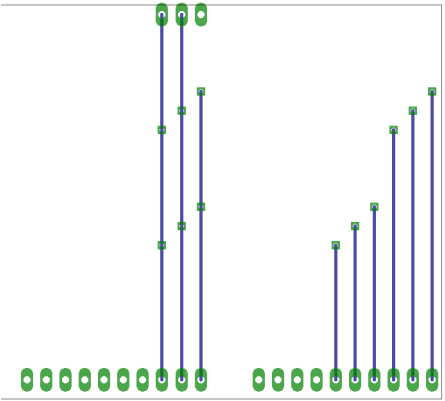
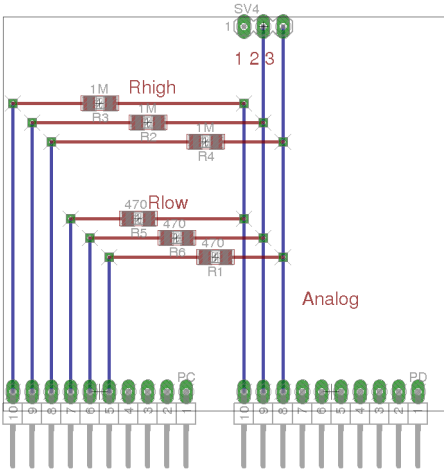
Status: OK

7.1 Schematic



7.2 Board

Normal, bottom mirrored, wires only:



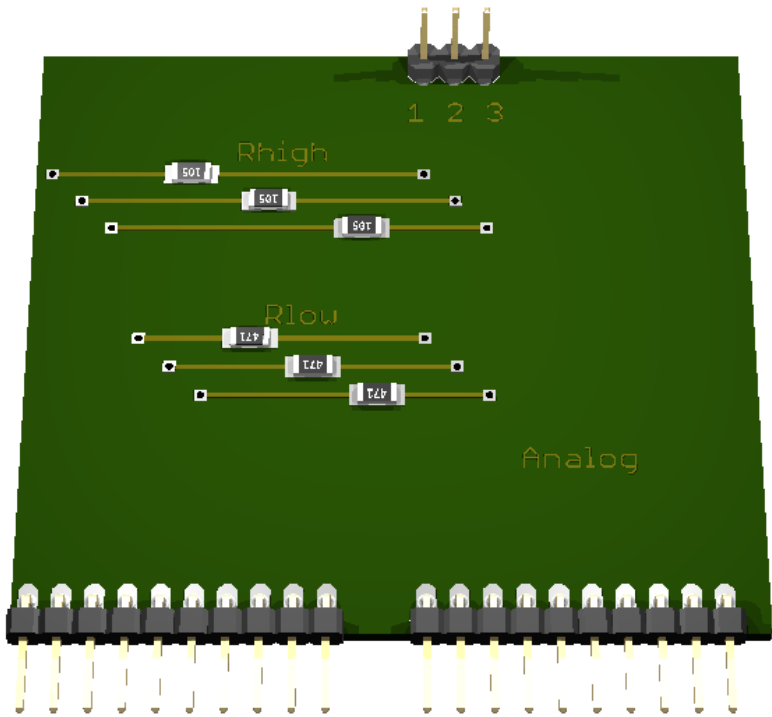
7.3 Partlist

Table 7.1:

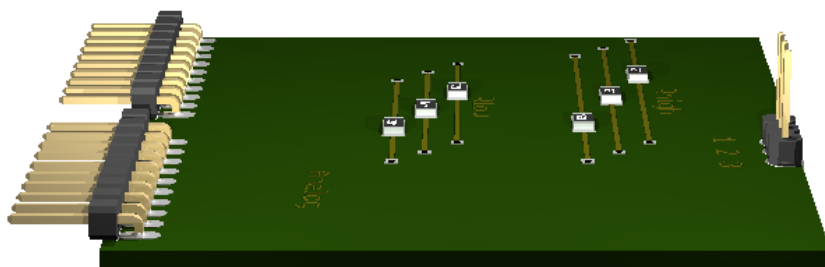
part	value	position
PC		(1.75 0.1)
PD		(2.95 0.1)
R1	470	(2.35 0.8)
R2	1M	(2 1.5)
R3	1M	(1.75 1.6)
R4	1M	(2.3 1.4)
R5	470	(1.95 1)
R6	470	(2.15 0.9)
SV4		(2.6 2)

7.4 3D view

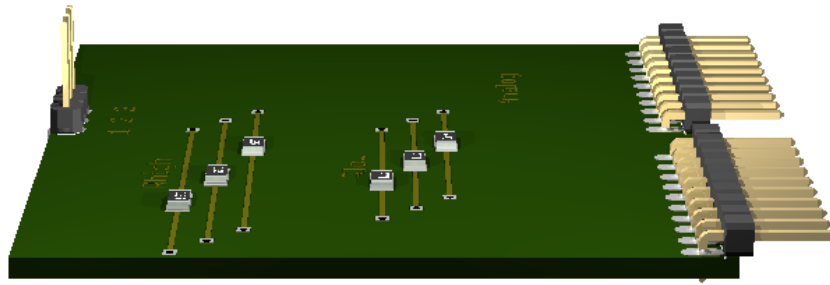
7.4.1 Front



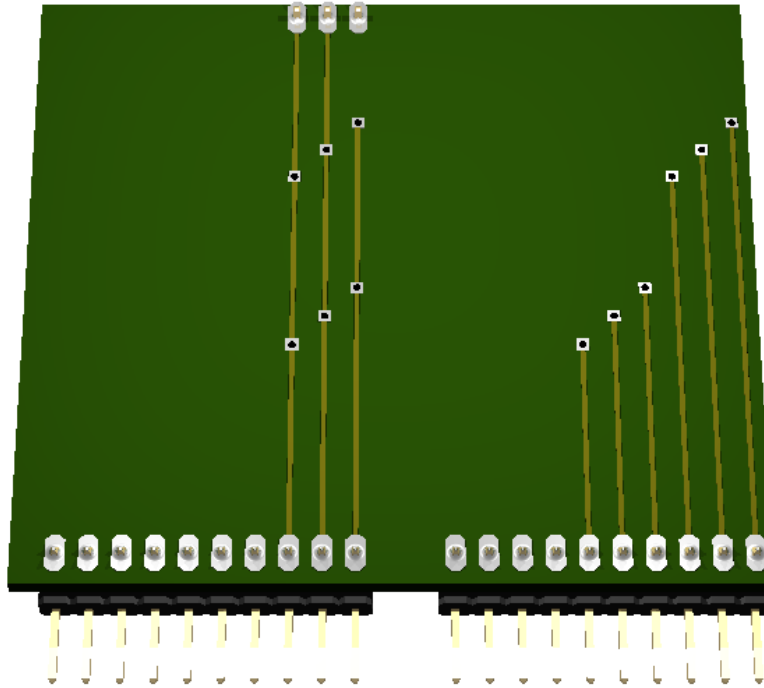
7.4.2 Right side



7.4.3 Left side



7.4.4 Bottom



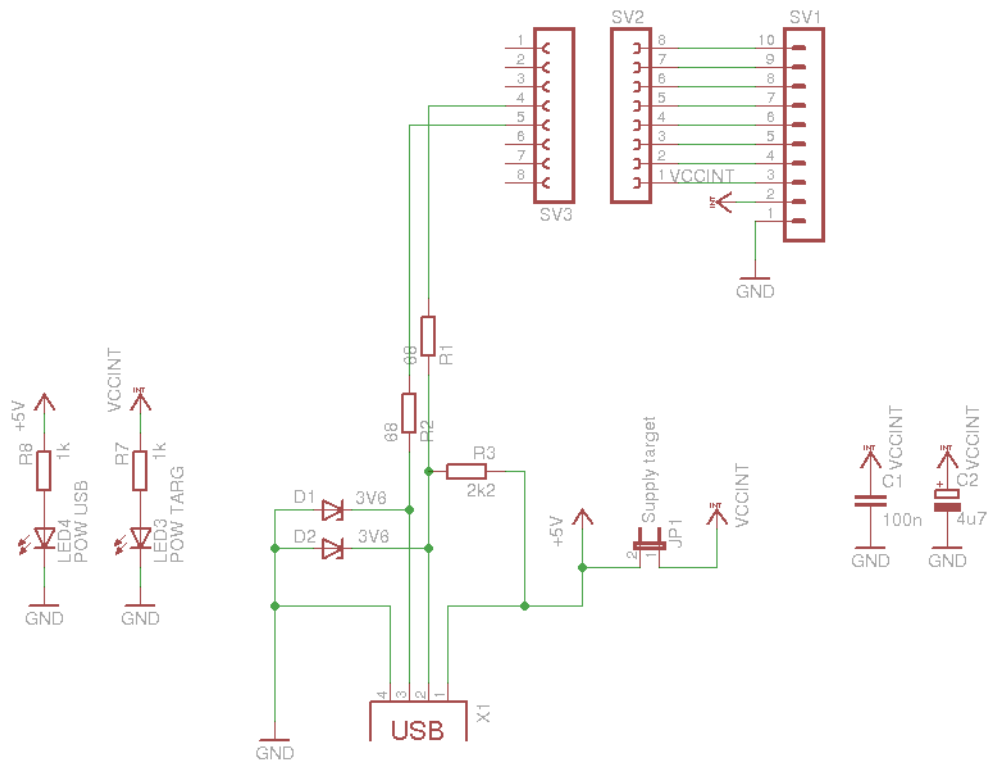
V-USB ADAPTER

Status: OK

TODO:

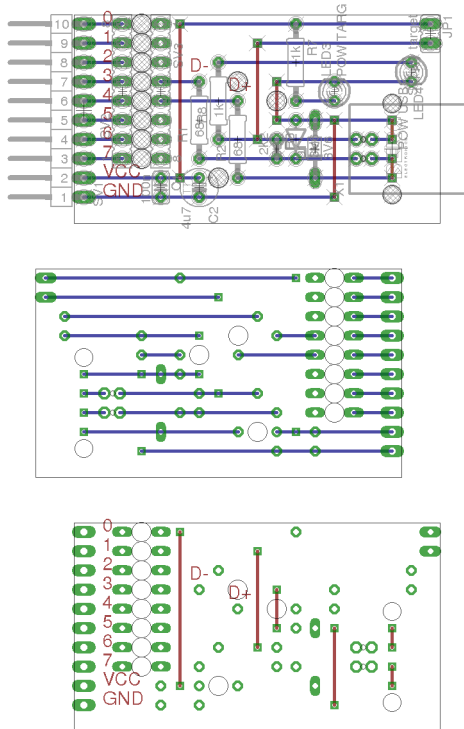
- connect pullup with IO port

8.1 Schematic



8.2 Board

Normal, bottom mirrored, wires only:



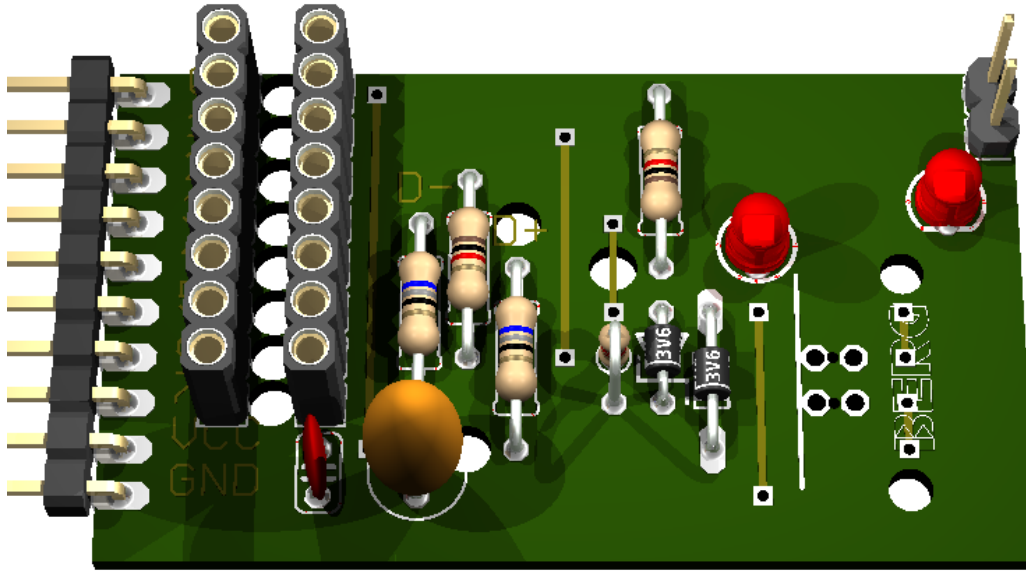
8.3 Partlist

Table 8.1:

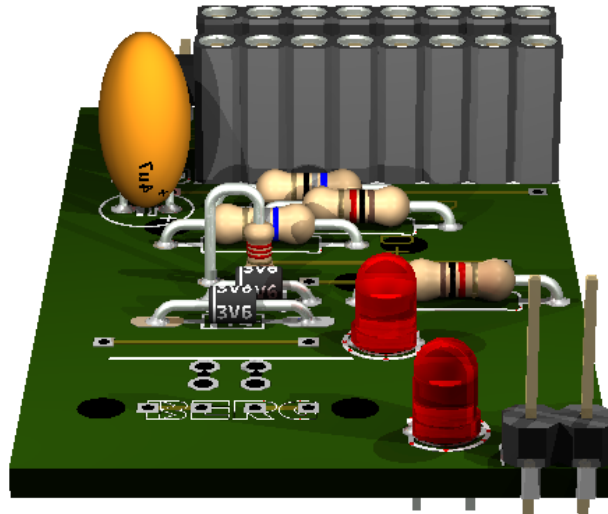
part	value	position
C1	100n	(0.9 0.25)
C2	4u7	(1.1 0.25)
D1	3V6	(1.7 0.45)
D2	3V6	(1.6 0.5)
JP1	Supply target	(2.3 1.05)
LED3	POW TARG	(1.8 0.75)
LED4	POW USB	(2.2 0.85)
R1	68	(1.1 0.6)
R2	68	(1.3 0.5)
R3	2k2	(1.5 0.45)
R7	1k	(1.6 0.9)
R8	1k	(1.2 0.7)
SV1		(0.5 0.65)
SV2		(0.7 0.75)
SV3		(0.9 0.75)
X1		(2.1 0.45)

8.4 3D view

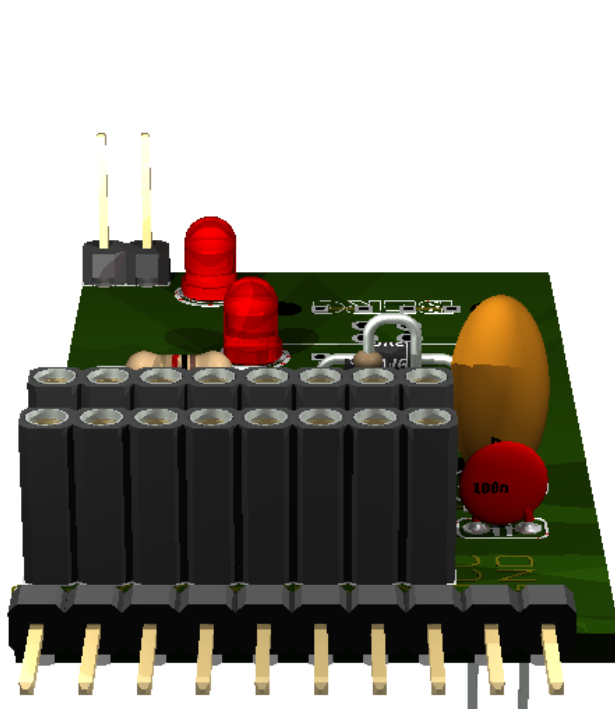
8.4.1 Front



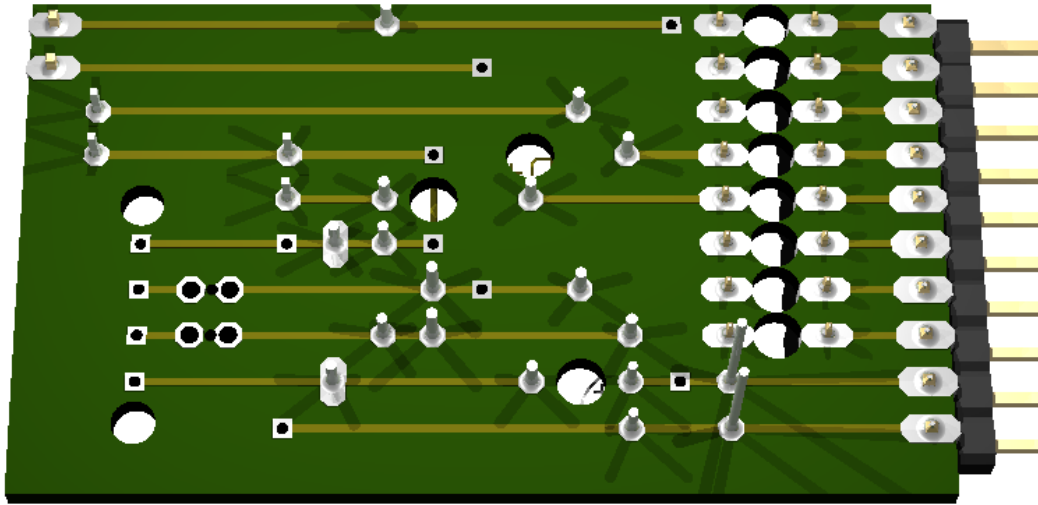
8.4.2 Right side



8.4.3 Left side



8.4.4 Bottom



8.5 original source

<http://vusb.wikidot.com/hardware>

“Solution B: Level conversion on D+ and D- Level conversion with Zener diodes.

Instead of reducing the AVR’s power supply, we can limit the output voltage on D+ and D- with Zener diodes. We recommend 3.6 V low power types, those that look like 1N4148 (usually 500 mW or less). Low power types are required because they have less capacitance and thus cause less distortion on the data lines. And 3.6 V is better than 3.3 V because 3.3 V diodes yield only ca. 2.7 V in conjunction with an 1.5 k Ω (or more exactly 10 k Ω) pull-up resistor. With 3.3 V diodes, the device may not be detected reliably.

If you use Zener diodes for level conversion, please measure the voltage levels to make sure that the diodes you have chosen match the requirements.

Advantages of the Zener diode approach:

- Low cost.
- Easy to obtain.
- Entire design can be at 5 V.
- AVR can be clocked at high rates.

Disadvantages:

- Not a clean solution, a compromise between all parameters must be found.
- Zener diodes come with a broad range of characteristics, especially at low currents, results may not be reproducible.
- High currents when sending high-level.
- High level is different for signaling and in idle state because signaling uses high currents to drive the diodes while idle state is driven by a 1.5 k Ω pull-up resistor.”